CHOLERA

Report Immediately by phone

Potential Bioterrorism Agent: Category B

Also known as: *Vibrio cholera*, Asiatic cholera and epidemic cholera

Responsibilities:
Hospital: Report immediately by phone
Lab: Report immediately by phone
Physician: Report immediately by phone
Local Public Health Agency (LPHA): Report immediately by phone; begin active surveillance for additional cases. Iowa Department of Public Health will lead the follow-up investigation.

Iowa Department of Public Health
Disease Reporting Hotline: (800) 362-2736
Secure Fax: (515) 281-5698

1) THE DISEASE AND ITS EPIDEMIOLOGY

A. Agent

Cholera is an acute watery diarrheal disease caused by enterotoxins produced by *Vibrio cholerae* bacteria. Two serogroups, O1 and O139, cause extensive epidemics and worldwide pandemics of disease. Non-toxigenic or non-O1, non-O139 V. cholerae infections can cause sporadic illness but do not cause epidemics.

Note: This chapter only pertains to *Vibrio cholerae*. Other species of *Vibrio* (e.g., *V. parahaemolyticus, V. vulnificus*) are not reportable except in outbreak situations.

B. Clinical Description

Symptoms: (Mild illness) Infection by O1 or O139 serogroups of V. cholerae usually results in asymptomatic or mild diarrhea.

Symptoms: (Severe illness) In approximately 1 out of 20 people infected, disease is more severe characterized by profuse watery stools, nausea, some vomiting and muscle cramps.

Complications: Dehydration may develop rapidly and lead to shock and sometimes death within hours. The case-fatality rate in severe untreated cases may exceed 50%; with proper treatment, the rate is less than 1%.

C. Reservoirs

Humans are the primary reservoir although environmental reservoirs exist in brackish or estuarine aquatic environments.

D. Modes of Transmission

V. cholerae is usually transmitted via the ingestion of food or water contaminated (directly or indirectly) by feces or vomitus of infected persons (e.g., via sewage) or by ingestion of raw or undercooked seafood harvested from polluted waters. Large epidemics often related to fecal contamination of water supplies or

street vendor foods have been recognized. The disease can spread rapidly in areas with inadequate treatment of sewage and drinking water.

E. Incubation Period

The incubation period ranges from a few hours to 5 days; more commonly within 2 - 3 days.

F. Period of Communicability or Infectious Period

The disease is not likely to spread directly from one person to another as long as standard infection prevention practices are followed; therefore, casual contact with an infected person is not a risk for becoming ill. However, cholera presumably has the potential to be transmitted person to person as long as stools test positive for the bacterium, most likely until a few days after recovery from symptoms. Shedding of bacteria may occasionally persist for several months. Antibiotics effective against the infecting strains shorten the period of communicability.

G. Epidemiology

Since the early 19th century, pandemic cholera has appeared off and on in most parts of the world. Cholera is a major cause of epidemic diarrhea throughout the developing world. There has been an ongoing global pandemic in Asia, Africa and Latin America for the last four decades. In 2009, 45 countries reported 221,226 cholera cases and 4,946 cholera deaths (case-fatality rate 2.24%) to the World Health Organization (WHO). Poor areas continue to report the vast majority of cases; 99% of cases were reported from Africa, continuing a trend.

In the United States, 5 – 10 cases are reported each year, with most cases occurring among travelers returning from areas experiencing epidemic cholera. Sporadic cases have also occurred among persons ingesting inadequately cooked shellfish harvested from coastal waters along the Texas and Louisiana borders. Currently, most cholera outbreaks have been linked to the El Tor biotype. Studies show that some protection against biotypes (strains) within a serogroup is conferred from previous infection. No protection, however, results from infection with O1 serogroup against O139 serogroup and vice versa.

H. Bioterrorism Potential

Category B Agent: *Vibrio cholerae* O1 and O139 are identified as a Category B bioterrorism agent, seen particularly as a water safety threat by the CDC. If acquired and properly disseminated, *Vibrio cholerae* O1 and O139 could cause a serious public health challenge because the bacteria are moderately easy to disseminate, result in moderate morbidity rates and low mortality rates, and require specific enhancements of CDC's diagnostic capacity and enhanced disease surveillance.

2) DISEASE REPORTING AND CASE INVESTIGATION

A. Purpose of Surveillance and Reporting

- To identify sources of major public health concern (*e.g.,* contaminated water or a contaminated lot of shellfish) and to stop transmission from such a source.
- To identify human cases of epidemic strains of *V. cholerae* to prevent transmission from such individuals.
- To identify cases and clusters of human illness that may be associated with a bioterrorist event.

B. Laboratory and Healthcare Provider Reporting Requirements

Iowa Administrative Code 641-1.3(139) stipulates that the laboratory and the healthcare provider immediately report any suspected or confirmed case. The reporting number for IDPH Center for Acute Disease Epidemiology (CADE) is (800) 362-2736. After business hours please call the Iowa State Patrol Office at (515) 323-4360 and they will page a member of the on-call CADE staff.

Report any suspicion of cholera called to your attention. This could take the form of a healthcare provider or laboratory inquiring about cholera testing. Note: Due to the rarity and potential severity of cholera, IDPH requests information about any suspect or known case of cholera, or any suspected exposure that may be bioterrorism in nature, is immediately reported to IDPH by the Disease Reporting Hotline (800) 362-2736.

Laboratory Testing Services Available

The University of Iowa State Hygienic Laboratory (SHL) will test stool specimens for the presence of *Vibrio cholerae*. It will further identify isolates of V. cholerae as serogroup O1. All V. cholerae non-O1 are sent to CDC for serogroup 139 testing. SHL will also confirm and/or further identify isolates of other *Vibrio* species obtained from stool specimens or other sources.

Additionally, SHL requests that all laboratories submit all isolates of V. cholerae, V. vulnificus and V.parahaemolyticus cultured for further testing to aid in the public health surveillance necessary for this illness. Blood specimens requiring serologic testing for evidence of recent infection are sent to the Centers for Disease Control and Prevention (CDC). Contact SHL for submitting blood samples to CDC. For more information about submitting specimens, contact SHL at (319) 335-4500.

SHL can test implicated food items from a cluster or outbreak. Food is submitted through the local public health department.

C. Local Public Health Agency Follow-Up Responsibilities

1. Case Investigation

a. Case investigation of cholera in Iowa residents will be directed by IDPH Center for Acute Disease Epidemiology (CADE) (due to the rare occurrence of cholera, the primarily imported nature of the disease, and its potential severity). If a bioterrorism event is suspected, IDPH and other response authorities will work closely with LPHA(s) and provide instructions/information on how to proceed.

b. Following notification to IDPH, the LPHA may be asked to assist in completing a Surveillance Report form by interviewing the case and others who may be able to provide pertinent information. The Iowa Disease Surveillance System (IDSS) is the preferred method of recording investigation information. Much of the information required on the form can be obtained from the healthcare provider or the medical record.

c. If several attempts have been made to obtain case information, but have been unsuccessful (the case or healthcare provider does not return calls or respond to a letter, or the case refuses to divulge information or is too ill to be interviewed), please contact IDPH/CADE staff for assistance. Please notify IDPH/CADE at (800) 362-2736 regarding progress on the case and use IDSS for case information data entry.

3) CONTROLLING FURTHER SPREAD

A. Isolation and Quarantine Requirements

Food handlers with cholera must be excluded from work.

Minimum Period of Isolation of Patient

After diarrhea has resolved, food handling facility employees may only return to work after producing one negative stool specimen. If the case is treated with an antimicrobial, the stool specimen shall not be submitted until at least 48 hours after cessation of therapy. In outbreak circumstances, a second consecutive negative stool specimen will be required prior to returning to work.

Minimum Period of Quarantine of Contacts

Contacts with diarrhea, who are food handling facility employees, shall be considered the same as a case and handled in the same fashion. No restrictions otherwise.

B. Protection of Contacts of a Case

Persons who shared food or water with a case during their infectious period should be observed for 5 days from last exposure for signs of illness. Preventive antibiotic therapy is usually not recommended for household contacts in the United States since secondary spread is rare. Immunization of contacts is not indicated.

C. Managing Special Situations

Locally Acquired Case

A locally acquired case of cholera is an unusual occurrence as most cases occur among travelers returning from areas experiencing epidemic cholera. If it is determined during the course of an investigation that a case or suspect case does not have a recent travel history to an endemic country, contact IDPH/CADE at (800) 362-2736 as soon as possible for assistance in instituting an investigation to determine source of infection and mode of transmission.

Reported Incidence Is Higher than Usual/Outbreak Suspected

If an outbreak is suspected, or if multiple cases are reported among people who have not traveled out of the United States, investigate to determine the source of infection and mode of transmission. A contaminated vehicle (such as water or food) should be sought and applicable preventive or control measures should be instituted. Since person-to-person transmission is theoretically possible, special emphasis should be placed on personal cleanliness and sanitary disposal of feces. Consult with IDPH/CADE at (800) 362-2736. CADE can help determine a course of action to prevent further cases and can perform surveillance for other cases that may cross several town lines and therefore be difficult to identify at a local level. If a bioterrorist event is suspected, IDPH and other response authorities will work closely with LPHA(s) and provide instructions/information on how to proceed.

D. Preventive Measures

Environmental Measures

Implicated food items from Iowa or elsewhere in the United States must be removed from the environment. A decision about testing implicated food items can be made in consultation with the Department of Inspections and Appeals, Food and Consumer Safety Division (DIA). If a commercial product is suspected, DIA will coordinate follow-up with relevant outside agencies.

Note: The role of the DIA is to provide policy and technical assistance with the environmental investigation such as interpreting the Iowa Food Code, conducting a Hazard Analysis Critical Control Point (HACCP) risk assessment, initiating enforcement actions and collecting food samples.

Personal Preventive Measures/Education

To avoid exposure, recommend that individuals:

- Not eat raw or undercooked fish or shellfish. Despite good sanitation, even shellfish harvested from coastal United States waters have periodically been contaminated with *V. cholerae*.
- Always wash their hands thoroughly with soap and water before eating or preparing food, after using the toilet and after changing diapers.
- After changing diapers, wash the child's hands and their own.
- In a child care, dispose of feces in a sanitary manner.
- When caring for someone with diarrhea, scrub their hands with plenty of soap and water after cleaning the bathroom, helping the person use the toilet, or changing diapers, soiled clothes, or soiled sheets.

International Travel

Travelers going to cholera endemic areas should pay attention to what they eat and drink. Avoiding risky foods may help protect against other illnesses, including traveler's diarrhea, typhoid fever, dysentery, and hepatitis A.

Travelers should:

- "Boil it, cook it, peel it, or forget it."
- Drink only bottled or boiled water, keeping in mind that bottled carbonated water is safer than un-carbonated water.
- Ask for drinks without ice unless the ice is made from bottled or boiled water.
- Avoid popsicles and flavored ices that may have been made with contaminated water.
- Eat foods that have been thoroughly cooked and that are still hot and steaming.
- Avoid raw vegetables and fruits that cannot be peeled. Vegetables like lettuce are easily contaminated and are very hard to wash well.
- Peel their own raw fruits or vegetables and do not eat the peelings.
- Avoid foods and beverages from street vendors.
- Avoid undercooked or raw fish or shellfish, including ceviche.
- Not bring any perishable food back to the United States.

For more information regarding international travel and the cholera vaccines, contact the CDC's Traveler's Health Office at (800) 232-4636 (general number) or through the Internet at www.cdc.gov/travel

At the present time, the manufacture and sale of cholera vaccine in the United States has been discontinued. It is not recommended for travelers because of the brief and incomplete immunity if offers. No cholera vaccination requirements exist for entry or exit in any country.

Two vaccines available in other countries may be more effective but neither is available in the U.S. (Dukoral®, Biotec AB and Shanchol®).

4) ADDITIONAL INFORMATION

The Council of State and Territorial Epidemiologists (CSTE) surveillance case definitions for Cholera can be found at: www.cdc.gov/osels/ph_surveillance/nndss/phs/infdis.htm#top

CSTE case definitions should not affect the investigation or reporting of a case that fulfills the criteria in this chapter. (CSTE case definitions are used by the state health department and the CDC to maintain uniform standards for national reporting.)

References

American Academy of Pediatrics. *2003 Red Book: Report of the Committee on Infectious Diseases, 26th Edition*. Illinois, American Academy of Pediatrics, 2003.
CDC Website. *Cholera* Division of Bacterial and Mycotic Diseases. Available at: www.cdc.gov/cholera/index.html
Heymann, D.., ed. *Control of Communicable Diseases Manual, 20th Edition*. Washington, DC, American Public Health Association, 2015.
Tauxe, R., Mintz, E., Quick, R. Epidemic Cholera in the New World: Translating Field Epidemiology into New Prevention Strategies. *Emerging Infectious Diseases*, 1995; 1:4, pp. 141-146.